BOTANY.—*A new genus of palms allied to Archontophoenix.* O. F. Cook, Bureau of Plant Industry.

Apart from the several species of Phoenix and Cocos, only one pinnate-leaved palm is commonly planted in the open air in California. This is usually known as *Seaforthia elegans*, but has also been called *Ptychosperma elegans*, *Archontophoenix alexandrae*, and *Archontophoenix cunninghamiana*. As these names belong to other species they should not be applied to the palm grown in California. Reference of the plant in question to Ptychosperma or Seaforthia is excluded because the seeds are not sulcate. In this respect there is agreement with Archontophoenix, but other characters are divergent.

One cause of confusion is that characters given by Drude, in Engler and Prantl's *Natürlichen Pflanzenfamilien*, as diagnostic of Archontophoenix are not found in the type of that genus, *A. alexandrae*. These discrepancies relate to the form of the pistillode and the structure of the fruit. Acquaintance with the true *Archontophoenix alexandrae* was gained by the writer in 1905, at Cordoba, Mexico, fruit and seed of an individual there studied agreeing closely with Mueller's original description and figures,[1] but differing from those of the familiar palm of California. For comparison with the genuine *Seaforthia elegans* ample material was afforded by palms studied in 1914 at the Belize Botanical Station, British Honduras. The identification of the latter material led to a recognition of the fact that the California palm was different from all of the species to which it had been supposed to belong.

Taking into account the original description of Archontophoenix and the characters of the type species, the pistillode should not be described as short and pyramidal in Archontophoenix, but as having the same slender, elongate form as in Ptychosperma and Seaforthia. Nor does the seed of the true *Archontophoenix alexandrae* have an adherent endocarp, as stated by Drude. The endocarp is represented in Archontophoenix by a firm, bony shell, rather thin, but hard and brittle, and

[1] Fragm. Austr. **5**: 47, *pls. 43, 44.*

readily separable from the seed. The raphe, instead of being broad and adherent, is a narrow, superficial strand of fibers, only slightly attached to the seed-coat.

The characters assigned by Drude to Archontophoenix—the short pistillode, the thin adherent endocarp, and the broad, adnate raphe—are in fact possessed by the palm grown in California, and are among the features which interfere with its assignment to Archontophoenix. Although Archontophoenix, as originally described in 1875 by Wendland and Drude,[2] was based upon Mueller's *Ptychosperma alexandrae*, Drude's later diagnosis seems to have been drawn for a different palm, perhaps the very species grown in California. The features of special interest in this comparison are summarized in the following key and diagnoses.

Archontophoenix Wendl. & Drude. Flowers white or greenish; stamens 9–12, the anthers about twice as long as the filaments; pistillode with long slender style exceeding the stamens. Pistillate flowers with petals equal to the sepals and of the same form; staminodes wanting. Fruit elliptical, with a thin fleshy pericarp containing rather narrow needle-like, simple or forked, longitudinal fibers, adherent to the outer surface of a thin endocarp of bony palisade tissue, distinct and readily separable from the seed-coats. Seed erect, oval or elliptic, with pattern of the rumination apparent on the surface of the seed-coats. Raphe represented by a narrow, vertical, superficial strand of fibers, only slightly adherent to the seed-coats.

Loroma Cook, gen. nov.

Flowers purple or lilac, the staminate with strongly carinate sepals and valvate petals; stamens 12–16, with anthers about half as long as the filaments; pistillode conic-pyramidal, deeply trifid at apex, much exceeded by the stamens. Pistillate flowers with sepals broadly rounded, ecarinate; petals exceeding the sepals, very broadly imbricate, unequal, with a broad angular emargination on each side of a broadly triangular apex; staminodes present, represented by a circle of six minute rudimentary filaments. Fruit subglobose, the pericarp supported by a layer of broad, flat, strap-like, slightly anastomosing fibers and an underlying layer of coarse-celled tissue closely adherent to the surface of the seed except at the base and apex, with no indication of a bony endocarp or shell of palisade tissue. Seed somewhat obliquely depressed at apex, the raphe represented by a broad vertical band of strongly adherent fibers, partially embedded in the seed-coats. Albumen rather deeply and coarsely ruminate; embryo erect, basal.

[2] Linnaea **39**: 214.

The derivation of the generic name refers to the strap-like form of the fibers surrounding the seed. In addition to the type, *Loroma amethystina*, known from cultivated plants in California, a second species, **Loroma cunninghamiana** (*Ptychosperma cunninghamiana* Wendl.), from northern Australia, is referable to this genus.

SYNOPTICAL KEY TO LOROMA AND ALLIED GENERA

Pistillode of the staminate flower similar to the fertile pistil, bearing three distinct rudimentary stigmas, these much exceeded by the stamens; seed protected by a layer of broad, strap-like fibers..... LOROMA.

Pistillode unlike the fertile pistil, bearing a long filiform style, this exceeding the stamens; seed with a coat of slender fibers..... 1.

1. Seeds oval, the surface even, without longitudinal furrows, enclosed in a thin bony endocarp, readily separable from a distinct woody seed-coat..... ARCHONTOPHOENIX.

1. Seeds with distinct longitudinal furrows, both endocarp and seed-coats thin and membranous..... 2.

2. Trunk extremely slender; leaves with remote pinnae; filaments shorter than the anthers; fruits oblong-oval, very strongly apiculate ..... PTYCHOSPERMA.

2. Trunk moderately robust; leaves with crowded pinnae; filaments longer than the anthers; fruit spherical or somewhat depressed, slightly apiculate ..... SEAFORTHIA.

The type of the genus Loroma is *L. amethystina*, cultivated in California, probably from Australia; of Archontophoenix, *A. alexandrae* (Mueller) Wendl. & Drude, from Australia, of Ptychosperma, *P. gracilis* Labill., from New Caledonia; of Seaforthia, *S. elegans* R. Br., from Australia.

Loroma amethystina Cook, sp. nov.

Trunk attaining a height of 8–10 meters and upward, the largest trunks about 30 cm. in diameter at the base, tapering above to 15–20 cm.

Leaf sheath 96 cm. long, the outer surface reddish, with numerous purplish-brown scales; texture rather thin, but tough and leathery. Petiole 9 cm. long, 4 cm. wide. Blade 2 meters long and more, with 70–80 pinnae on each side, the basal and terminal pinnae much narrower and shorter than the others. Lowest pinnae 24 cm. long, 0.4 cm. wide, or sometimes only 0.2 cm. wide; fifth pinnae 36 cm. long, 1.3 cm. wide; middle pinnae about 80 cm. long, 4.5 cm. wide; subterminal pinnae about 30 cm. long, 1.4 cm. wide; terminal 1 cm. wide. Midribs of pinnae with long coarse scales beneath. Rachis triangular, convex below, sharply carinate above, the insertions of pinnae very deeply folded. Tips of leaves very slender and drooping, usually turned on edge (as in *Attalea cohune* or *Phoenix canariensis*).

Inflorescences developed in the axils of living leaves, but not ap-

pearing until the leaves fall, the spathes opening as soon as released by the falling of the leaf, and the flowers soon after. Spathes 2, of nearly equal length, strongly compressed, white and of very thin delicate texture, their protective function being performed by the leaf-sheaths. Newly opened inflorescences deep purple in color, the flower buds much more crowded than in *Seaforthia elegans*, the branches covered with a short close pubescence or scurf, this at first creamy yellow, changing to light sulphur yellow, then fading to white. Flowering branches simple, about 60 cm. long, strictly pendent almost from the first, not erect-spreading or merely drooping from the weight of the fruits as in *Seaforthia elegans* and other allied genera.

Flowers purplish-pink throughout, including the petals, the filaments and the connective of the anthers, and the pistillodes, but the anthers and pollen uncolored. Sepals broadly imbricate, acutely angled at apex and with a strong median carina, the fleshy basal portion somewhat pinkish. Petals rather stiff and horny, translucent when fresh, and with an abruptly thickened, transverse, fleshy pulvinus at base. Stamens 12–16, usually 13–15, often with some of the filaments double. Pistillode about half the length of the filaments, not produced into a long filiform style, but with 2 or 3 divergent prongs, these usually unequal (or only one, the others rudimentary), sometimes united with one of the filaments, inserted with the filaments at the apex of a broad, turbinate cushion of loose, spongy texture.

Fruits subglobose, coral pink, 12 mm. long, 11.5 mm. wide; stigma subapical, borne on a slightly elevated rim; epidermis smooth or with slight, scattered, raised points; pericarp fleshy, thin, less than 0.5 mm. thick, supported by a firmer layer containing numerous broad band-like fibers adhering to form a shell-like coat separable with difficulty from a less fibrous layer of marbled white and coarse red cells underneath, this marbled layer strongly adherent to the thick brownish seed-coat and often entering deeply into the ruminations. No layer of bony palisade tissue under the fibers as in Archontophoenix.

Seeds subglobose, 10 mm. in diameter when fresh, somewhat obliquely depressed or flattened above, slightly broader than long, not sulcate, slightly flattened at the base, but not provided with adherent basal and apical cushions as in Seaforthia. Surface of seed with an adherent fibrous layer, the raphe represented by a broad band of vertical embedded fibers. Albumen of rather soft, loose texture, with deep and irregular ruminations, broader and less numerous than those of *Archontophoenix alexandrae*, extending about half way to the center of the seed. Color of ruminations in fresh seeds pale yellowish brown, becoming rusty brown in dry seeds. Embryo erect, exactly basal.

The type specimen, no. 694813 in the U. S. National Herbarium, was collected at Santa Barbara, California, by the writer, November 11, 1914, the type individual being one of several unusually fine palms in the collection of Mr. C. B. Hale, under the care of Mr. W. H. Morse. The specimen consists of branches of an inflorescence, with unopened flowers and ripe fruits. The characters and measurements of the

trunk, leaves, and the mature flowers were drawn from a palm standing at the side of the Court House in San Diego, California.

This species, or at least a member of this genus, is represented also in the Economic Herbarium of the U. S. Department of Agriculture by two vials of dried fruits from Australia, one from Baron von Mueller, formerly director of the Botanical Garden at Melbourne, and the other from Dr. J. H. Maiden, Director of the Botanical Garden at Sidney, the latter received as *Ptychosperma elegans* (S. P. I. No. 1329). These two lots, which are very closely alike, differ from the typical material in having the strap-like fibers somewhat narrower and more frequently branched. Fruits from the Philippine Islands, collected by Mr. H. Boyle, are somewhat smaller than those from Australia.

Nothing has been learned regarding the introduction of Loroma into California, but its botanical relationships indicate that it is a native of northern Australia, along with the true *Seaforthia elegans* and *Archontophoenix alexandrae*. Though both of these palms have been reported very frequently from California, their existence there is not certain; the confusion of names would naturally obscure the need of introducing genuine examples of the species. The newly recognized type is a distinctly larger and more robust palm than the true *Seaforthia elegans*, but smaller and more slender than the true *Archontophoenix alexandrae*, which is more similar in general appearance to the royal palms of the American tropics.

The habit of the inflorescences to remain enclosed in the leaf-bases, and thus secure protection till the time of flowering, may be considered as an adaptive specialization. The very soft thin texture of the spathes indicates that these have little or no protective function. In the case in which it was possible to observe the sequence of events the spathes opened on the same day that the old leaf fell off; the blade of the leaf was dead, but the tissue of the basal sheath was still rather fresh.

Flowers in alcohol showed on the next day a notable brown discoloration of the petals and filaments, but the anthers remained white. The change of color seemed to be dependent on exposure to the light, or to the air in the bottle. Flowers on the under side of the mass were scarcely changed, the delicate pink tint still appearing fresh. The name chosen for the species alludes to the very attractive color of the flowers, which is rather unusual among palms.

In attempting a specific identification of the cultivated palm just described almost as many difficulties were encountered as with the

generic designation. Its reference to *Loroma cunninghamiana* would appear to be justified by some descriptions, but the type of this species seems to have been a smaller palm and different in other respects. The case is complicated at the beginning by the fact that the two original accounts of this species, by Hooker and Wendland, do not agree. Hooker's description and plate, published in 1857,[3] under the name *Seaforthia elegans,* indicate a relatively small, slender palm with a broad flat crown of horizontal spreading leaves, and about 30 pinnae on each side of the midrib. The form of the leaves appears to be oblong, with little indication of the extreme reduction of the pinnae at the base and tip, or of the tendency of the leaves to stand erect and turn on edge, as shown in *Loroma amethystina.* This individual had been raised at Kew from seed sent from northern Australia by Allan Cunningham, but no definite locality was given.

The most obvious discrepancy is that Wendland, in proposing the new name *Ptychosperma cunninghamiana,*[4] gives the number of pinnae as 55–65 on each side of the rachis. It appears that Wendland had a palm in his garden in Germany that had been considered as distinct from *Ptychosperma elegans;* but the new species was not named until after Wendland had visited Kew and seen the palm that had been raised from Cunningham's seed—the individual figured by Hooker as *Seaforthia elegans.* In naming the species *Ptychosperma cunninghamiana* and referring to Hooker's plate as the only published illustration, Wendland must be considered to have adopted the Kew palm as the type of his species. Yet it is difficult to believe that a botanical drawing made at Kew would have failed to show an approximation to the correct number of pinnae. The possibility that Wendland studied a different palm in Germany and included some of its characters in the description naturally suggests itself.

A color difference is indicated in Hooker's account of the flowers, which are described as "a pale, dull lilac," instead of a rather bright pinkish purple, as in *L. amethystina.* The staminodes also appear much larger in Hooker's drawing than in the type of *L. amethystina.* Hooker states that the palm was "said to attain a height of 30 feet in its native country," while Wendland and Drude, in transferring the species to Archontophoenix in 1875,[5] give the height as 40–60 feet, and add several other particulars that may not relate to the original

[3] Curtis' Bot. Mag. III. **13**: *pl. 4961.*

[4] Bot. Zeit. **16**: 46.

[5] Linnaea **39**: 214.

cunninghamiana, and yet are not altogether in agreement with *amethystina*. The pinnae are said to attain a length of 80 cm. and a width of 7 cm. The length of the pistillodes is given as 3–4 mm., and the filaments 2–3 mm.; whereas in *amethystina* the filaments are about 4 mm. long and the pistillodes only 2–3 mm. The length of the inflorescence is given as about 60 cm., with the ultimate divisions 30 cm. long; while the inflorescences of *amethystina* are over a meter long, with the flowering branches 60 cm. long. Wendland states that there are 18 stamens in *cunninghamiana* and Hooker's plate shows 18. The flowers of *amethystina* collected at San Diego usually had less than 15; over twenty flowers were examined without finding more than 16 stamens.

In view of these differences it has seemed desirable to recognize the California palm as a distinct species, instead of attempting to base the new genus on a species whose characters are so largely in doubt.

BACTERIOLOGY.—*Bacillus abortus in market milk.* ALICE C. EVANS, Dairy Division, Bureau of Animal Industry. Communicated by L. A. Rogers.

An organism of considerable interest which occurs commonly in milk is that which causes contagious abortion in cattle. In 1911 Schroeder and Cotton[1] reported this organism to be common in milk. They demonstrated its presence by the inoculation of guinea pigs. Whenever *Bacillus abortus* was present in the milk there was a slow development of lesions which resembled those of tuberculosis. This organism has been shown to be pathogenic for all kinds of laboratory and domestic animals. Whatever may be its effect on human health is unknown; but in view of its pathogenicity for animals it will naturally be regarded with some suspicion in its relation to human health until its nonpathogenicity has been demonstrated. Interest in this direction has been stimulated by the work of Larson and Sedgwick,[2] who reported a large percentage of positive results in a

[1] Schroeder, E. C., and Cotton, W. E. The bacillus of infectious abortion found in milk. U. S. Dept. of Agric. Bur. of Animal Industry, 28th Annual Rpt. 1911.

[2] Larson, W. P., and Sedgwick, J. P. Complement deviation reaction in the blood of children using the *Bacillus abortus* as an antigen. Rpt. of the Annual Meeting of the American Association of Medical Milk Commissions. 1913.